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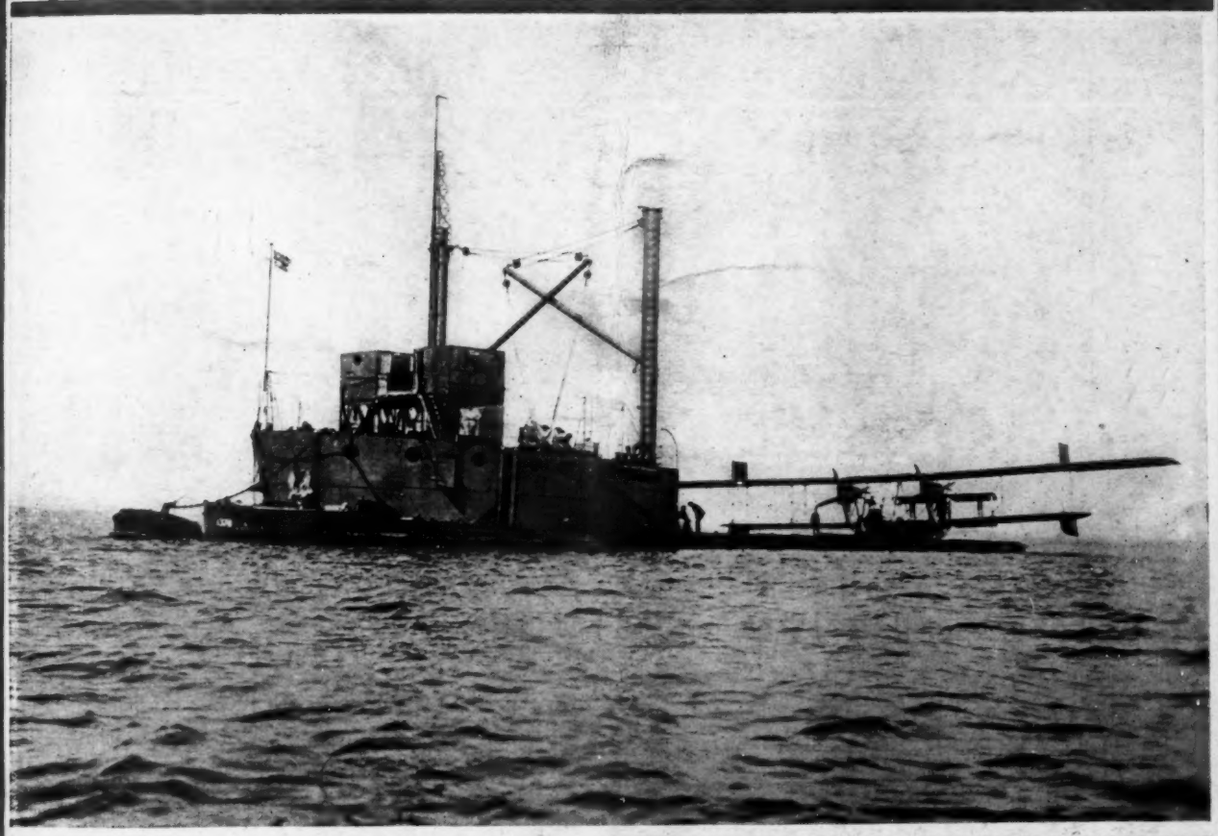

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VOLUME XIII

Number 20

SPECIAL FEATURES

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THE GENERAL DESIGN OF COMMERCIAL AIRCRAFT

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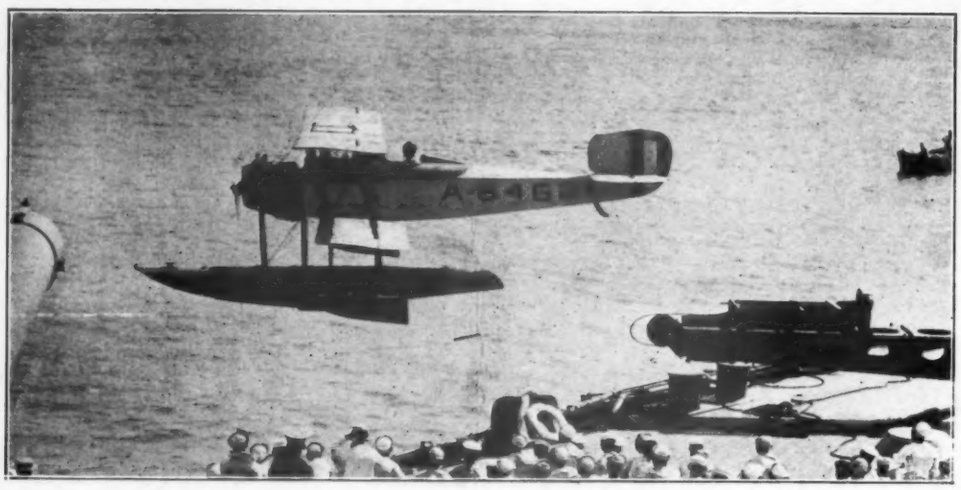

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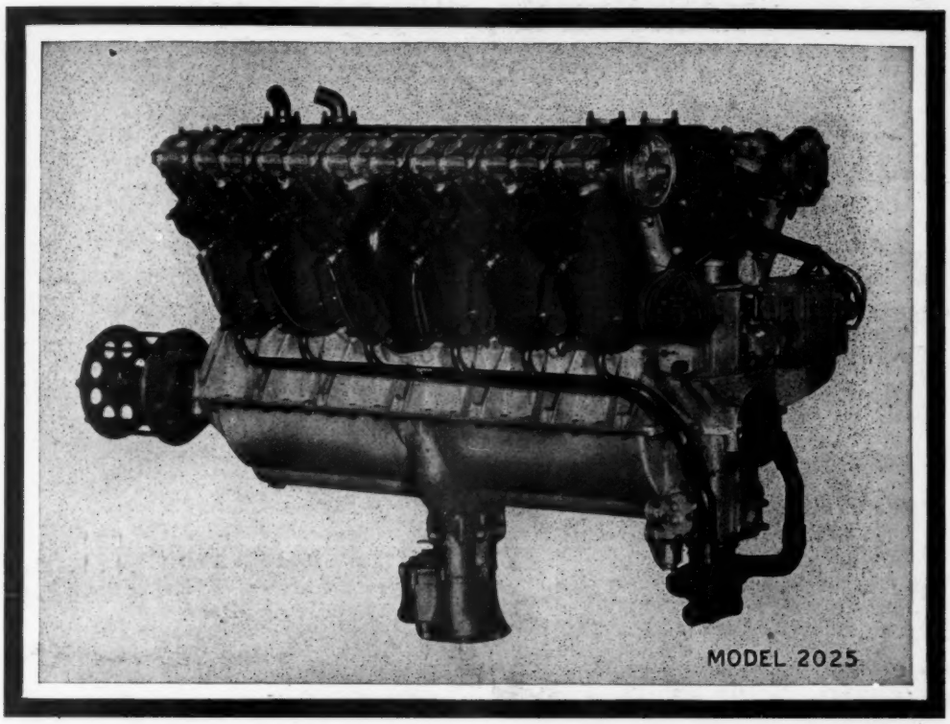

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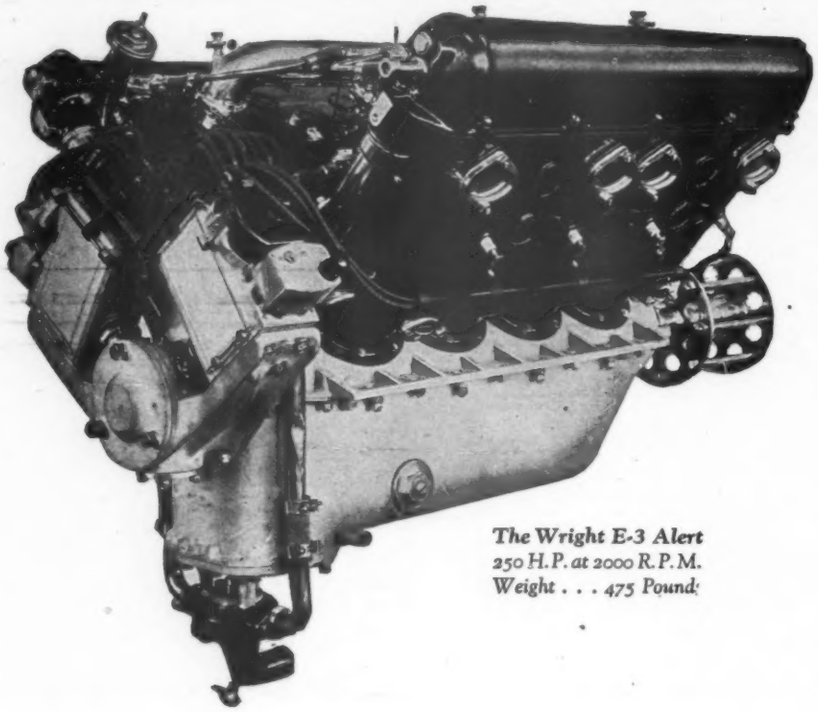

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VOL. XIII. NO. 20

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CONTENTS

Editorials 655
The General Design of Commercial Aircraft 656
Monmouth, Ill., Airport 660
The U. S. Navy Airship Mooring Mast 661
Report on Goldbeaters' Skins for ZR1 662
The Improved Army-Liberty Engine 663
"Who's Who in American Aeronautics" 664
2000-Mile Non-Stop Flight 665
N.A.C.A. for National Air Policy 665
Boston Air Board Created 665
Army and Navy Air News 666
Aeronautical Map of Italy 668
Long Cross-Country Flight 668

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AVIATION

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EDWARD P. WARNER
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Vol. XIII NOVEMBER 13, 1922 No. 20

The General Design of Commercial Aircraft

DESIGNERS of commercial aircraft will find much of interest in the N.A.C.A. report of the above title, by Prof. Edward P. Warner, which is reprinted in the present issue. Professor Warner recently returned from an extensive tour of Europe in behalf of the sailplane of the Aeronautical Engineering Society of M.I.T., which E. T. Allen piloted so skilfully abroad until an untimely crash eliminated him for the time being.

What Professor Warner has to say about the general lack of attention designers of commercial aircraft display toward the passenger's comfort and convenience, applies with equal force to many of our own, so-called commercial airplanes. But in this country such shortcomings may be excused on the ground that we have relatively little experience with passenger-carrying airways, for such services as we have are only "seasonal"—instead of operating all the year round. Lack of subsidies has, furthermore, not justified the construction of specially designed commercial aircraft in America, particularly in view of the fact that large stocks of low-priced war machines, readily convertible for commercial uses, are still available.

In Europe, on the other hand, these conditions do not obtain. There, regular passenger-carrying airways have been in existence ever since the summer of 1919, and they have been regularly running since, bolstered up by heavy government subsidies. The converted war machines have by now been largely eliminated abroad, and newly designed purely commercial ships have come to be used. It is therefore astonishing to hear that more progress should not have been made in Europe with a view to attracting the traveling public to the airways by affording it a reasonable amount of comfort.

Comfortable seats and ample leg room are of course the prerequisites of passenger comfort, but adequate ventilation without drafts is a problem which it is just as important to solve, whatever the difficulty involved. Judging by actual experience, poor ventilation is by far the most unsatisfactory feature to be found in today's cabin planes, although large machines are as a rule better in this respect than small ones. Vibration of the structure under the impulse of the power plant is another undesirable feature which designers would do well to study with a view to its elimination. In this connection it should be noted that this vibration may be very strong in a cabin without even being noticeable in the *open* pilot cockpit, and also that the vibration of twin-engined ships is generally worse than that of single-engined ones.

It will be seen that the above remarks merely concern the comfort and convenience of the passenger, and do not enter into the problem of commercial efficiency proper. We believe that American designers have a great opportunity to make improvements on present commercial aircraft design. In order of importance we place the comfort of the passenger at the head of the list, believing that once the public finds that it can travel by air as comfortably as in a limousine, it will take to air travel as a matter of course, and so make the airways pay long before any theoretical improvement in pay load could bring about this result.

American Achievements in the Air

THE remarkable 2000-mile non-stop flight made from San Diego, Calif., to Schoen Field, Kan., by Lieutenants John A. Macready and Oakley G. Kelly of the Air Service is but another proof of the growing ascendancy American aviation has achieved in the last two years.

At the time of writing American aviators hold the world's official maximum speed and altitude records and the unofficial world's duration and distance records—the four most coveted aeronautic honors. Lieutenant Macready's altitude record of 34,509 ft., made on Sept. 28, 1921, still stands unbeaten. Brig. Gen. William Mitchell, Assistant Chief of Air Service, holds the world's official maximum speed record with 224.05 m.p.h., which he made at Detroit Oct. 18. Lieutenants Macready and Kelly hold both the unofficial world's record for duration (35 hr. 18 min. 30 sec.) and for distance (2,000 miles)—both performances being far in excess of previous achievements.

All four performances were made by officers of the U. S. Army Air Service, which may feel justified pride at this wonderful showing of professional skill by its members.

Considering the backward position the United States occupied in aircraft construction upon its entry in the Great War, and the wonderful strides this country has since made in aeronautic design, construction and operation, despite a financial outlay inconsiderable in contrast with that of European nations, we may be excused for feeling the thrill of justifiable pride. The Air Service pilots who gave the world a tangible proof of our growing ascendancy in aeronautics deserve well of the nation, and the lustre their accomplishments bring upon the Air Service will be their greatest recompense.

The Maynard Benefit Meet

THE aviation meet to be held at Curtiss Field, Garden City, L. I., on Nov. 19, next, to assist the needy family of the late Lieut. Belvin Maynard, is an event which should have the patronage of the entire aeronautical community. The great flier who found an untimely end through circumstances foreign to his better judgment and flying skill, was a pioneer in every sense of the word. His victory in the Transcontinental Airplane Race of 1919 afforded a striking example of the value of careful preparation combined with grit and flying skill.

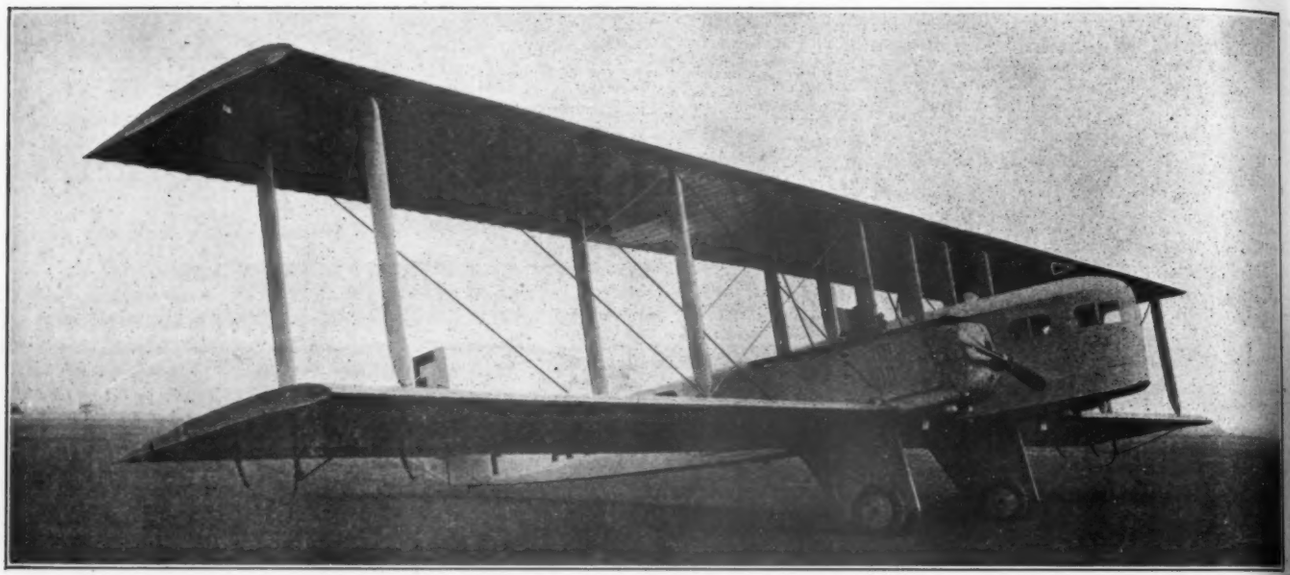
We can no better honor his memory than by attending the benefit performance organized in behalf of his widow and children.

The General Design of Commercial Aircraft *

By Edward P. Warner

Professor of Aeronautics, Massachusetts Institute of Technology

It has too often been the practice of those responsible for the selection of airplanes for use on the European air transport lines to choose them with regard primarily, if not solely, to their commercial efficiency, to the pay load carried per horsepower, with secondary attention to accessibility and ease of maintenance. The passenger's viewpoint has too often been neglected, apparently on the theory that the passenger requires nothing except to be shot through the air from one city to another at maximum speed. In general, however, travelers will not ride a second time on a line where they have been uncomfortable or where they have had a feeling of constant strain and of omnipresent danger during their flight.



The new Farman "Goliath" 12-passenger transport airplane, equipped with two 300 hp. Renault engines. The greater power and freedom from vibration of the new powerplant make the new "Goliath" a very satisfactory airliner

Since the passenger's point of view has seemed to be the one which suffered by neglect, it is that point of view that I have endeavored to preserve during my recent travels on European air-lines, and it is as a passenger that I have undertaken to discuss the airplanes in which I rode.

My air travels covered a little under two thousand miles, in the course of which I made use of six distinct types of airplane, one of those types being fitted with different engines on the two routes on which I used it. The airplanes and engines and the distance covered in each are tabulated below:

DH 34	Napier Lion	230 miles
Handley-Page W8B	2 Rolls-Royce Eagles	230
Farman Goliath	2 Salmsons	170
Potez IX	Lorraine	260
Spad 33 (Berline)	Lorraine	350
Spad 33 (Berline)	Salmson	290
Fokker F.III	Siddeley Puma	110

Seating Comfort

If the features which affect the passenger's enjoyment of an airplane trip are to be listed in order of importance first place must be disputed between seating comfort and ventilation of the cabin. In respect of seating most of the designs are much alike, being fitted with wicker chairs having low backs and cushions about 2 in. thick. The conspicuous exception is the Fokker, which is fitted with leather-upholstered seats the cushions of which are some 12 in. deep and sprung more easily than any automobile seat cushions. The effect on the passenger is somewhat similar to that of making him the stationary element of a seismograph, the airplane rising and falling in bumps while the seat cushions give the passenger the impression that he is stationary in space while the airplane moves around him. Personally, I found this seating very comfortable, but the only case of air-sickness that I actually saw this summer was on the Fokker, although the ventilation of the cabin was perfect and the air was not at all rough. One of the De Haviland engineers told me that Capt. De Haviland had made an extended investigation of this question of seating arrangement and had become convinced that the wicker chair was preferable, quite apart from its lighter weight, and it is interesting to note that on the most recent Fokkers, those fitted with Rolls-Royce engines, the deeply-sprung leather seats have been replaced by the more conventional type.

Ventilation

There is no doubt that most cases of air-sickness are due to insufficient ventilation of the cabin. While the very important matter of ventilation seems simply to have been ignored in some instances, it is not easy to secure satisfactory results even after the most careful study. The awkward nature of the problem and the difficulty of treating it by the accepted methods and formulas of the heating and ventilating engineer have been fully pointed out by Colonel Beatty in his recent paper to the Royal Aeronautical Society. The major difficulty was there shown to be the small size of the cabins and the small volume of air per passenger.

In no case is there any evidence, in the airplanes under discussion, of elaborate provision for forced ventilation. There usually are small openings in the roof of the cabin (in the Handley-Page, for example) which serve for the outflow of air, but the primary dependence is placed on the windows, which can be open or closed as the passengers desire. This works out very well in warm weather, but it would of course be almost impossible to keep the cabin heated to a comfortable temperature in winter if it has to be ventilated by opening

* N.A.C.A. Technical Note No. 113

windows directly beside the passengers. The windows are generally arranged to slide horizontally, only a small part of the glass on each side being movable. In the Handley-Page, for instance, only two panes on each side slide, the remainder being permanently set.

The Fokker is an exception in the use of large windows, a single one on each side, which drop vertically much like the windows of a closed automobile. The ventilation arrangement on that airplane is almost ideal for summer flying, and the Handley-Page and DH34 are also very satisfactory. On the Potez the windows are small, and the air at times is bad, but it seems difficult to do better with a biplane having so small a cabin. My chief complaint against the windows on the particular Potez on which I traveled falls under head of view, the panes being of yellowish color and unsatisfactory transparency. A good grade of non-shatterable glass should be, and generally is, used.

The Farman Goliath and the Spad are peculiar in that there is direct communication between the cabin and the cockpit. The opening between the two cannot be closed, and heating would therefore be very difficult, the heated air all tending to flow to the cockpit and up and out around the pilot's head. There is a further disadvantage, particularly marked on the Spad, where the cockpit is behind the cabin, in that there is a slight depression inside the cockpit. As soon as a window is opened, therefore, the air tends to flow through with great violence, blowing in the face of the passenger who sits beside the open window. To reduce the disagreeable effects of this draft, openings are provided in the roof, and when these are opened for ventilation the air entering there rushes down the aisle between the passengers, passing out to the cockpit. Incidentally, the windows on the Spad differ from all others in that, circular in form, they swing instead of sliding. The swinging window appears to me distinctly inferior to the sliding type, as it has to be almost fully opened before it is possible to get a clear view through it, and the window and its frame project far into the cabin when open. The Farman has movable windows (sliding) in the rear cabin. In the front cabin, however, where the windows face almost exactly in the direction of motion, ventilation is provided by little metal panels below the windows. These panels can be slid back to uncover a dozen holes about ¾ in. in diameter.

The DH34 (450 hp. Napier "Lion" engine)—which carries nine passengers and pilot at a cruising speed of 105 m.p.h., with fuel for 3½ hr. Wing area 590 sq. ft. Maximum permissible weight 7200 lb.

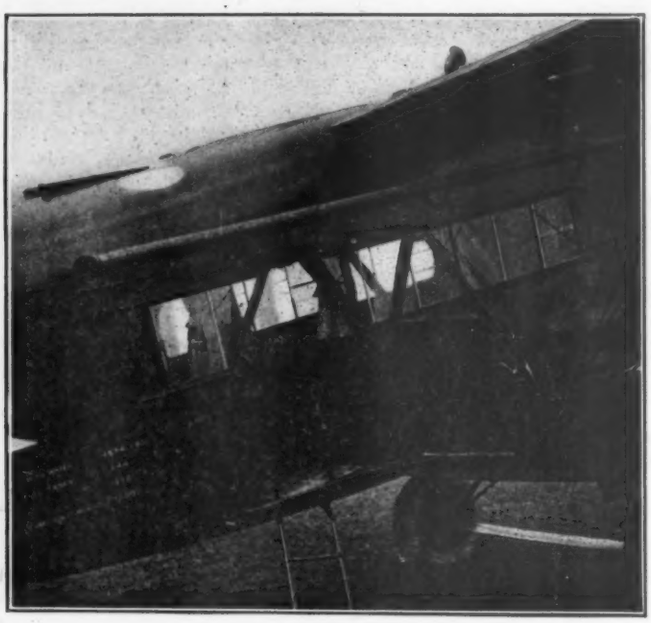
Noise

The subject of noise in commercial airplanes is one which has been badly neglected. As a result of having talked with many passengers immediately after their first air trips, as well as with others of more experience, I am convinced that the excessive noise of present-day airplanes is one of the greatest handicaps that commercial aviation has to meet. Many passengers have told me that they were glad to have made a flight, for the experience, but that they never want to make another. Being pressed for reasons, they nearly always allude to "the infernal racket" and declare themselves almost deaf after a three-hour journey.

Speaking first of the way in which the airplanes compare, the DH34 is much the quietest. It is possible to converse inside the cabin of that airplane, even when a window is open, without shouting to an uncomfortable extent. Another American and I talked almost continually during the flight from London to Paris. We did not have to approach closer than eighteen inches from each other, and we were not hoarse when we arrived in Paris. I dwell on the incident at some length because there are few airplanes in which it would be possible to duplicate it. Not even the DH34 can be considered satisfactorily quiet, but it represents a long step ahead. I have heard other travelers make some complaint of gear noise on the DH34 with the Lion engine, but I personally did not notice it. Next in order of merit I put the Goliath and the Handley-Page, bracketing them together. The first-named is, if anything, a little the better. In these airplanes it is possible to make oneself understood by shouting very close to the listener's ear, but conversation is an exhausting undertaking. Next comes the Fokker with windows open (it would undoubtedly be better with them closed), in which a shout can sometimes be understood, but not with regularity. Finally, in the Potez and Spad, conversation is virtually impossible under any conditions. It might be possible to hear a few words in the middle part of the Spad cabin with the windows closed. I did not have a chance to try it. In the Potez, however, I rode for two hours in company with two other passengers, during which time none of us was able to make the others understand a single word, and we had to communicate by writing.

On most of the European air-lines it is the practice to give each passenger some cotton, advising them to put it in their ears. It seems to me that no airplane on which such measures are necessary is fit for serious commercial work, and the passing out of cotton is in the nature of a confession that the airplanes used are far too noisy.

The noise comes, of course, chiefly from the engine exhaust, and this part of it can be much reduced by fitting a long exhaust pipe. That is done on the DH34, and it is noticeable that the noise becomes greater as one approaches the rear of the cabin and the end of the pipe. Another factor which



Close-up of the door of the DH34—a clever arrangement insuring strength and roominess

is sometimes important is the vibration of the airplane structure itself. This is notably the case in the Fokker, where the slapping of the fabric covering against the steel tubular structure of the fuselage appears to be a major element in the sound.

Seating Arrangements

The seating arrangements on all the large airplanes are the same, individual chairs being placed on each side of the cabin, with an aisle between them. On the Goliath there are two cabins, connected by an aisle which runs alongside of the pilot's position. The mechanic is ordinarily seated in this aisle, and has to remove his stool and crawl in partially under the pilot's seat whenever passengers wish to walk to and fro.

In the smaller airplanes there is more diversity of arrangement. On the Spad five passengers are carried, three of them riding inside the cabin in chairs facing forward, one in a similar chair facing backward, and the fifth in the cockpit beside the pilot, behind a windshield so excellent as to render goggles unnecessary. The arrangement of seats so that some or all of the passengers face toward the rear is undesirable, as it is likely to cause air-sickness, and this feature of the Spad design can hardly be approved. Carrying passengers in the cockpit is also an expedient of doubtful wisdom. It seems safer to follow the practice adopted by the Daimler Co. and always to use the second seat in the cockpit for a reserve pilot capable of operating the controls in case the regular pilot is injured or becomes ill.

The Fokker, which also carries five passengers, employs quite a different scheme. Three persons are seated side by side on a seat which runs across the back of the cabin, the other two occupying chairs a little farther forward and against the sides. This seems to me the best arrangement that has been produced for a five-passenger cabin.

The Potez has a four-passenger cabin, and the seats are in pairs. The cabin is not wide enough to leave an aisle between the seats, and one of the rear seats is directly against the door. The airplane is therefore loaded by removing the chairs and allowing the passengers to get in and then sliding the chairs in behind them. There is a metal cross-tube running across between the front and rear rows a little higher than a man's waist, and it is necessary for the forward passengers to duck under this to reach their places. It is a little too crowded for comfort in getting in, but there is plenty of room for the passengers after they are once installed.

The leg-room is remarkably good in the cabins of all these airplanes. I am considerably above the average height, but I had no complaint to make against any of them in that respect.

The chairs are always fastened in place, of course. In a few instances, as in the rear seat of the Fokker and in one or two of the larger airplanes, they are permanently installed, but in most cases they are held by a piece of shock-absorber cord with a hook at each end, running from an eye-bolt in the floor to one in the chair.

Safety belts are provided only in the Spad. Their provision seems to me unwise. They are useless unless they are fastened all the time, and an ordinary passenger will not strap himself in except after a lecture on the dangers of accident which will make him want to abandon the trip altogether. The psychological effect of the belt is bad, and there should be no vital necessity for it inside of a closed cabin. It is better to fasten the chairs down and to make their arms of such form that it is easy to hold on in case of a rough landing.

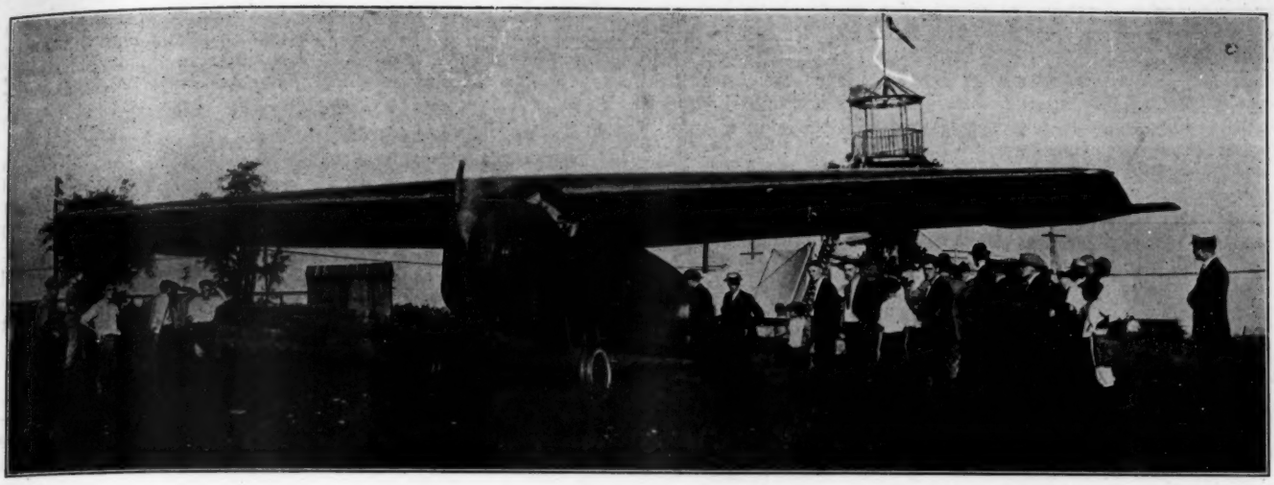
Cabin Doors

Doors are provided in all the airplanes now in actual commercial use, on one side only. They are satisfactorily large in most cases, the Potez being the most cramped for entry and exit, which is natural, as it is the smallest airplane in every way. In several of the airplanes under consideration it is something of an acrobatic feat to alight without assistance from outside, but that assistance is always available except in case of a forced landing. None of the doors are high enough to enter without stooping, but it is not really necessary that they should be, and I think, on the whole, that the present situation in this respect does not require improvement.

One feature which has been given some attention is the possibility of a door's being opened or opening itself in flight and allowing a passenger to fall out. No such accident has ever happened, but it seems wise to make definite provision against it. On the Fokker a steel bar is lowered across the door and locked in place, so that the weight of a passenger leaning out of the window falls on the bar and not on the door itself. Parenthetically, I may remark that such precautions do little good unless they are used, and that on my flight from Brussels to Amsterdam the mechanic who closed the door forgot to lower the bar. Provision against the opening of the door is also made in the Goliath, incidentally to the attainment of another end, by the running of a fuselage bracing wire across the door. The wire has a quick detachable fitting of the lever-and-toggle type at one end, and it can therefore be disconnected and removed while the passengers are getting in and out, being replaced before going into the air.

The storage of baggage is a problem of considerable and growing importance, especially in view of the number of

Interior view of the cabin of the Fokker F.III passenger carrier



Fokker F.III 5-passenger cabin monoplane which is extensively used on the Dutch and German airways

tourists who are crossing from England to the Continent by air and who want to take with them everything that they own. The amount of this business is much larger in Europe than it would be likely to be in America, as the rates for international express service in Europe are fantastically high. A voyager by air from Paris to London actually finds it cheaper to take his baggage with him in the airplane than to send it by express, to say nothing of the fact that the express service takes about a week for two hundred and thirty miles. When I last crossed to England by Handley-Page I took with me in the airplane more than two hundred pounds of books and documents obtained on the Continent, and paying excess baggage on them by air actually was the cheaper method of transporting them.

Handling Baggage

There are three general methods of handling baggage. It may be sent along in another airplane especially fitted for its reception, it may be stacked in the cabin, or it may be carried in a baggage compartment not directly connected with the cabin. The first method has been little used as yet, although one of the London-Paris lines has recently put on a special baggage and express service by airplanes without seats, the whole cabin being filled with express matter, and an American tourist well-known in aeronautical affairs in this country recently hired two airplanes, one for his family and another for his trunks, to take him across the Channel.

The second method, that of carrying the baggage in the cabin, is generally used in the French airplanes. It would be very undesirable were it not that the French lines are running as a rule with a very low percentage of full load, thanks largely to the great generosity of their subsidy, and there is nearly always plenty of spare room for the baggage, which is simply stacked between chairs and in the aisle. Trunks, however, cannot be handled in this way. To give an indication of the condition existing on the French lines on the Continent and the amount of space available and unused inside the cabin I have tabulated my own experiences below.

Route	Airplane	No. seats	No. passengers	% load
London-Paris	DH34	8	7	88
Paris-Brussels	Goliath	12	2	17
Brussels-Amsterdam	Fokker	5	3	60
Prague-Vienna	Potez	4	1	25
Vienna-Prague	Potez	4	1	25
Prague-Strasbourg	Spad	5	1	20
Strasbourg-Paris	Spad	5	1	20
Paris-London	Handley-Page	10	8	80

The French companies on the London-Paris route are doing better than those on the Continent, although not so well on the whole as the English undertakings.

The carrying of baggage in the cabin can only be considered a temporary makeshift, and the only real solution is the use of a special compartment, such as is provided on the DH34 and on the Handley-Page. In the DH34 the baggage compartment is behind the cabin, thus being far from the center of gravity of the airplane, and the changing weight of baggage is likely to interfere with balance in flight. When I flew in that airplane the weight of baggage was unusually large, and we had been off the ground only a few minutes when the pilot requested that the heaviest passengers should take seats as far forward as possible and that the one vacant seat should be the rearmost one. On the Handley the likelihood of such difficulty is reduced by the provision of two compartments, one behind the cabin and the other in front, below the pilot in the very deep fuselage. The weight in the rear compartment can then be kept substantially constant. These compartments and the doors leading to them are large enough to admit a good-sized trunk.

Interior Arrangement of Cabins

The interior decoration schemes on the transport airplanes actually in use are much simpler than were those shown at the last two Paris salons, and the change is, on the whole, for the better. Lace curtains and similar ornaments were not only unnecessary but positively dangerous, owing to their inflammability. The most elaborately finished of the airplanes now in actual use is the Fokker, closely followed by the English airplanes, all of these having carpeted floors and cloth-covered or cleanly-painted walls and ceiling, and an evident effort having been made to keep the interior as neat as possible without allowing it to become ornate. The interiors of the three French airplanes used are very plain, being finished simply in brown or yellow paint.

The subject of interior arrangement naturally includes any arrangements made for the information and diversion of the passengers. The French lines make no such arrangements. On all the airplanes except the French ones, there are notices posted in the cabin for the purpose of instructing and allaying the nervousness of those traveling for the first time. They carry prohibitions of smoking and of throwing anything out of the windows (on the Goliath there was no prohibition of smoking, and the mechanic passed cigarettes around to the passengers) and comforting information to the effect that the bumps that will be felt merely correspond to waves at sea and do not represent any danger, the airplane being inherently stable (there may be some question as to how many of the passengers know what "inherently stable" means). They further add, in the two larger airplanes, the information that passengers can move about freely and change seats while in the air, the slight redistribution of weight having no effect on the control. This is very wise, as the novice in air travel often seems to fancy that he is in a vehicle more tricky than a canoe, and sits staring straight in front of him with every muscle strained throughout the journey. The notice in the Handley goes on specifically to urge the passengers to relax and take it easy, while the Fokker notice, printed in three

languages, says: "The pilot of this airplane has been selected after long training. He knows his business. Trust him and don't worry."

The notices are very useful, but they are sometimes too small to be read by all the passengers, and it would be well if they were supplanted, in accordance with the plan adopted by the Deutsche Luftreederei, by little booklets of information and suggestions for air passengers, to be given out to each person when they purchase their ticket. I heard the other day (it is a frivolous story, but it made two enemies for air travel) of two American girls who traveled for three hours of a hot day in the rear seats of a DH in which there were no other passengers. They could not read all of the notice in the front of the cabin, but saw something about windows (the warning not to throw anything out) and thought that it said not to open them, so they nearly suffocated and had a most unpleasant trip.

Many of the passengers, particularly those who are regular patrons, feel an interest in the performance of the airplane, and I have seen one or two of them carry pocket altimeters. It seems obvious that it would be wise to provide instruments inside the cabin, but I have seen this done only on the Handley-Page, where an altimeter and an air-speed meter are located on the forward wall. There is no notice provided regarding them, however, and many of the passengers don't know what they are. I believe that these instruments should be installed in all cabins, with a few words of explanation below regarding the causes of changes in speed.

Pilot's Position and Communication with Pilot

On the two English airplanes under discussion and on the Fokker the pilot sits forward of the cabin, the passengers being placed at least near the trailing edge of the wings, if not actually behind them. On the Potez and Spad, as on most of the early British commercial designs, the pilot is behind the cabin, while on the Goliath he is between the two parts of the cabin. Opinion among pilots as to the relative merits of the different positions is variable, but there can be no doubt that it is better, from the point of view of the passengers, to have the pilot in front. The only flaw in a forward position, so far as those who pay to ride are concerned, is that on a twin-engine airplane their forward view is obstructed by the pilot. Its obvious advantage is greater safety, and if the possibility of crashes must be taken into account the safety of the passengers must be the first consideration. The pilot is paid to take the risk; the passengers are not. There have been too many accidents on airplanes with the pilot in the rear, where one or several passengers have been killed or badly hurt while the pilot has escaped uninjured.

It is desirable that the pilot and passengers should be able to communicate in emergency, and this is possible in most cases. On the Spad and Goliath, as already noted, there is direct connection between cabin and cockpit. The Potez has an opening about four inches in diameter in the instrument board. It is ordinarily covered with a metal door, but can be opened by the pilot. On the Handley-Page there is a door, ordinarily closed, between the cabin and the quarters of the mechanic, who sits beside and below the pilot and who also serves as radio operator, radiophone being carried on all the large British commercial airplanes. The DH34, like the Potez, has a little door between cabin and cockpit, the cockpit in this case being forward of the cabin. The door can be opened from either side, and a notice instructs the passengers, should they wish to communicate with the pilot, to open the door and push a note through. On the Fokker, pilot and passengers are in two different worlds from the instant the engine starts, so far as the possibility of communication is concerned.

Pilot's Accommodations

I cannot say much about these, since I was of course unable actually to occupy the pilot's seat during flight. The field of view for commercial purposes appears satisfactory in all cases. The Fokker is of course extremely blind upward and to the rear, but the view in the direction of travel is exceptionally good.

None of the airplanes examined except the DH34 make provision for two pilots. Even in that instance there is only one control, which can be operated by either pilot.

The pilot's equipment of instruments is usually simply the ordinary lot provided on military airplanes. On the DH34 and Handley-Page, however, a turn indicator and a lateral inclinometer are carried. The turn indicator is of the static head type on the Handley-Page, gyroscopic on the DH.

View from Cabin

By far the best airplane in this respect is the Goliath, where an uninterrupted outlook forward and to each side is obtained from the forward cabin. The Fokker is a close second, thanks to the large windows and the parasol monoplane wing. A good view for the passengers is of enough importance so that I believe that it should weigh very heavily in choosing between the wing locations characteristic of the Fokker and Junkers monoplanes.

The range of view from the biplanes depends largely on the seat occupied. It is reasonably satisfactory, on the whole, although the swinging circular windows in the Spad offer some interference.

Safety

I have already emphasized the importance for safety of getting the passengers as far as possible from the nose of the fuselage. The only particular case that needs to be mentioned

Spad S33 six-seater (245 hp. Salmson engine). Pay load, 1452 lb.

is that of the Goliath, an airplane which is extremely steady in flight and with a very slow landing speed, but which has a cabin projecting forward of the wings, wheels, and everything else, where it would take the full force of the impact in case the airplane nosed over. Despite the remarkably fine view obtained with this arrangement it seems to be undesirable on the score of safety.

The choice between the single-engined and the two-engined airplane is of course largely influenced by considerations of safety, either real or imaginary. Personally I am an advocate of the single engine, on the theory that an engine failure means a landing with either type and that there are twice as many chances of an engine stopping if there are two as if there is only one which can stop. The two-engined type has, however, an undeniable psychological advantage. Passengers, both novices and those with some experience, testify to an increased sense of security in seeing two engines in full operation.

Monmouth, Ill., Airport

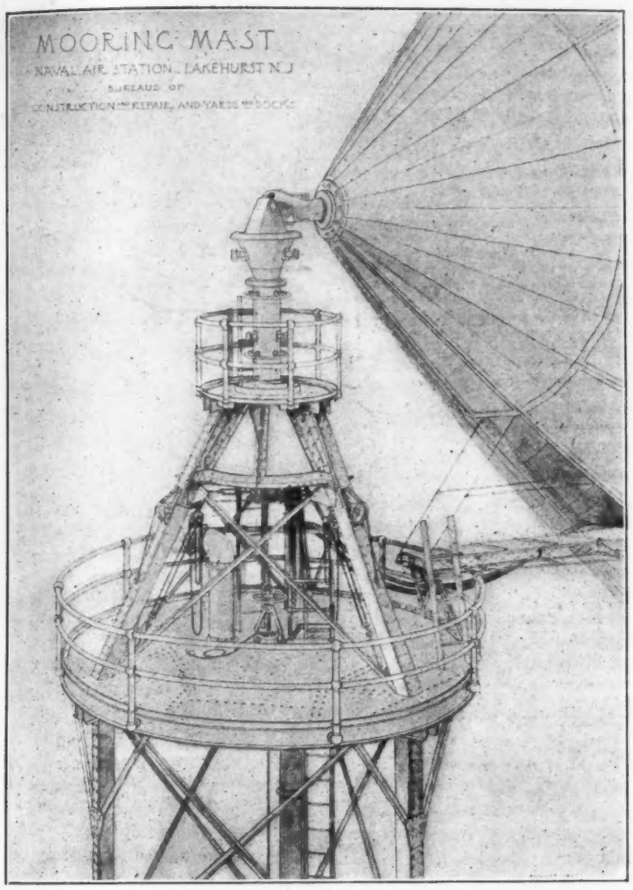
The city of Monmouth, Ill., which staged a very successful flying meet last spring, has now a permanent airport. The Mid-West Airways Corp., which is the corporate title of the citizens controlling the airport of Monmouth, has just been incorporated by Fred B. Pattee, C. G. Jenks, C. W. Buchanan, C. J. Smith, I. F. Dains and E. P. Field, for $25,000 divided among about 100 stockholders.

This step, which was decided upon recently by members of the local aero club, completes the arrangements whereby control of the landing field and the handling of traffic via airplanes is put on a business basis.

With this arrangement, civil flying is expected to continue thriving as it has in the year already passed since the landing field was established. With ships equipped to carry two passengers and the Bréguet for larger parties, much business is being gained by serving people who wish to go on a trip either as a novelty or because time is essential.

The U. S. Navy Airship Mooring Mast

Interesting Details of a Greatly Perfected Appliance for Mooring Airships in the Open



Diagrammatic sketch of the platform and gear of the Lakehurst mooring mast

There has just been completed by the Navy at Lakehurst, N. J., the tallest airship mooring mast yet built, and the first to be constructed without any wires.

It consists of (1) foundation for tower, machinery and snatch block anchorages; (2) a triangular steel tower 165 ft. high, with three platforms, passenger elevator, pipe lines for gas, fuel, oil and water, electric lighting for night operation, telephone and voice tube systems; (3) the mooring gear at the top; and (4) the mooring gear at the bottom.

In appearance it is much like a great radio tower which, more than anything else, quickly distinguishes it from its foreign ancestors, standing on its three great legs at the vertices of an equilateral triangle.

At the base of the tower is a building for housing four officers and twenty men, forming the landing crew; an office elevator entrance, one main and two auxiliary winches for the lines used in bringing the ship to the mast, together with the pumps for water, fuel and oil.

The elevator runs in an interior rectangular framework to a platform 136 ft. above the ground. From this a ladder extends 12 ft. upward to the main operating platform; at 160 ft. altitude is the third platform and the gimbal of the upper mooring device proper.

Up the tower leads a pipe line for delivering 18,000 lb. of water in an hour. Fuel is pumped at 1500 gal. in the same time. A 12 in. pipe, with fabric tube to the ship, supplies 300,000 cu. ft. of hydrogen or helium gas an hour under one inch pressure.

On the extreme upper platform is the gear for receiving and securing the ship, together with the connections for the water, gasoline, oil, and gas piping which couple on to the ship's lines.

Surrounding the tower is a circle of forty-eight snatch block anchorages at equal intervals. The diameter of this circle is 1000 ft. Each anchorage has a heavy U bolt for taking a snatch block. There are also provided additional anchorages for snatch blocks or fair lead sheaves to make it possible to lead two lines from any two of the guy line snatch blocks 120 deg. apart to the two auxiliary winches in such a direction as to feed properly.

In docking, a ship is brought into the wind and approaches the mast. At a convenient distance her main hauling line is let go through the ship's cone. This line is then coupled on by the crew to a main hauling line which runs from the main winch, up the tower, and has been dropped from the cup at the top of the mast to the ground where it meets the ship's line. The slack is then taken up by the main winch and the ship is gradually pulled toward the head of the mast by electric power.

After this hauling-in has begun, and when the bow of the ship is near the circle of snatch block anchorages, two guy lines are dropped from the cone of the ship and coupled on to corresponding lines from the auxiliary winches. These lines lead from the winches in the base of the tower to the snatch blocks which are at 60 deg. on either side of the direction of the wind, through such fair lead sheaves as may be necessary to make the lines feed properly on the winches, also operated by electricity. These latter are run until a mark on each line appears at the corresponding snatch block, when the auxiliary winches are stopped, the lines then being simply

The mooring mast for airships at the Lakehurst naval air station

held. At this point there is just sufficient line between the snatch blocks and the ship's bow so that the ship's cone can be brought into the cup on the ram of the mooring gear at the top of the mast.

The main hauling line continues to draw the ship forward and down until the ship's cone enters the revolving cup.

Hauling is then continued at reduced speed while the spring in the ram is compressed until the ram has entered the outer tube, a distance of about 5 ft., when it latches itself in the "in" position. The main hauling winch is then stopped. With the ship attached to the revolving cup and the ram in the "in" position the hand winches on the main platform are manned and the ram brought to a vertical position by the centering lines. Rod stays are then put in place and tightened up, fixing the ram and tube in this vertical position. The centering lines are then slacked off and the ship rides to the structure of the mast alone.

The two guy lines are released from their winches and the ship's portions withdrawn into the ship. The ship then overhauls the main hauling line, withdrawing it up the mast and into the body of the ship until the coupling to the winch appears on the operating platform. Hauling is stopped and the winch line is secured so that it can not fall down the mast when the coupling is broken. A light line is then attached to the ship's half coupling and the hauling line completely withdrawn into the ship.

The passengers, baggage, armament or freight may then pass over a gangway let down from the bow of the ship to the main platform of the tower where it rests on a portable pad to prevent chafing.

In leaving the mast, the ship is trimmed sufficiently light to rise as soon as it is released from the mast, the releasing hook is opened, the ship rises and the mast is again ready to receive.

Report on Goldbeaters' Skins for ZR1

By M. Meadowcroft

Aeronautical Department, Goodyear Tire and Rubber Co.

During the period October, 1921, to present date, in which the construction of skinlined gas cells for rigid airship ZR1 has been going on, a number of difficulties have arisen in connection with the supply and quality of the goldbeaters skins used.

From experience obtained in England on the construction of the gas cells used in rigid airships, the opinion was stated that skins of South American origin were the most satisfactory. The U. S. Navy's specifications for ZR1's gas cells embodies this statement, consequently skins from South America only have been used to date. The results have been disappointing, for an amount varying from 25 to 55 per cent of each cask of skins have been rejected as unfit for use in skin lining.

The chief grounds for rejection have been three in number: (1) rotten or decomposed skins, (2) fatty skins, (3) skins too small in size to be of use. The first was most serious, and was accounted for by the writer by the conviction that the skins had been in stock for a long time (at least two years). This was later verified by packing housemen, who on being asked privately, admitted we had received skins some of which were probably three years old.

The Domestic Supply of Skins

The maximum number of skins obtainable during any period was also very doubtful, no reliable information being obtainable up to the time of this visit to Chicago. It seemed certain, however, that the supply of domestic skins was greater in number and more certain in both supply and quality, therefore, it was decided to make tests as to the suitability of North American skins for gas cell work. Three hundred skins were obtained direct from Chicago, being guaranteed by the packers as thoroughly representative of the usual run of skins. These were of three grades, as follows: 100 Armour's No. 1, 100 Armour's No. 2, 100 Swift's No. 1.

These skins were kept separate, prepared and laid in the usual manner, and finally diffusion tests were made from the finished fabric. Diffusion of fourteen samples from each were as follows:—

	High	*Low*	*Mean*
Armour's No. 1	4.5	0.57	1.88
Armour's No. 2	3.97	0.57	1.18
Swift's No. 1	1.98	0.64	1.12

The average of these are all below the accepted maximum of 3 litres/sq. m./24 hr. usual for this fabric, and the results apparently justified the use of such skins provided everything else in the origin, etc., appeared to be suitable. The visit to Chicago was an effort to clear up all the unknown and doubtful points relative to skins, and a description and notes follow.

How the Skins are Prepared

The stomach and intestines of the animal are removed as one unit, being all encased in a heavy layer of fat. This unit consists of four main parts, as follows:—(1) the stomach, which is itself divided into three parts, (2) the "middle intestine," (3) the "bung gut" or "blind gut" and (4) the "round intestine." This unit is laid on a long table, having a metal top with turned-up edges, on which water is kept running to keep it clean. Several men handle each set of intestines, each having his own distinct operation to carry out. The stomach is placed in a chute, and passes on to another room where it is further dealth with. One end of the "middle intestine" is then placed over a spigot of water, and flushed out, the water, under pressure, entering for two or three feet, and then being followed along with the hand for the whole length of intestine until it is completely cleaned out. The next cut detaches the "bung gut," on the outside of which is the thin "goldbeaters skin." This gut is also flushed out with water, and the fat removed with a sharp knife, used with a stripping or slicing action.

In removing the fat, Armour & Co.'s method is to pull the intestines loose from the layer of fat and place them in a deep tank, from which the workman picks up the end and takes a turn around a wooden post, holding tight with the left hand, and stripping off the fat with a knife, used in the other hand. In this way he cleans two or three feet at a time, and continues unhitching and hitching around the post until the whole length is cleaned. A final washing in water completes the operation, after which the intestine is salted and packed in casks for shipment.

Swift & Co.'s method of removing the fat seems better and quicker. The workman pulls the intestines, still held together by the layer of fat over the edge of the table, and holds a knife in such a position that on pulling on one end of the tube, it is separated cleanly from the fat, and carried away with a continuous pull, falling into a tank, where water is kept spraying over it. This whole operation only takes about 30 seconds, and results in a cleaner tube than Armour & Co.'s method, which requires four or five minutes to complete.

How Goldbeaters' Skin is Obtained

The "goldbeaters' skin" is removed from the "bung gut" while held under water, and is obtained as follows—The thumb is forced between the skin and the gut proper, at the point where the "middle intestine" was cut off, and followed along to the "blind" end of the gut, tearing the thin skin in a more or less straight line, and gently separating it from the thick bung gut itself, though not damaging the latter. The blind end is then taken hold of bodily and the separation

of the skin completed by pulling it back toward the open end of the gut, as far as possible. This is a skilful operation and even the trained workers tear a number of skins in the act of removing them. These have to be thrown away, the average number of spoiled skins being from 20 to 25 per cent.

The surface of the skin known as the "smooth" side, is that in contact with the bung gut before removing and the "rough" side consequently is that surface which needs scraping, finally to remove all fat previous to skin laying on cloth.

The skins when removed were washed in the water, and taken to the salting bench where soft clean salt is rubbed over both sides, and the salted skins placed in bundles of 25, being graded as No. 1 and No. 2 according to size. All skins are left the full natural width (varying from 7 in. to 14 in.), and those 30 in. or more long are grade No. 1, while all between 20 in. and 30 in. are graded No. 2. It is evident there is no control over the amount of inherent fat or the size, these being just what the animal makes, according to its age, condition, etc., as previously mentioned. It is generally conceded, however, that the skin from an aged cow is bigger and thicker than a young one.

The bundles of salted skins are next placed in casks which are thoroughly paraffined inside and tamped down. Usually 2500 No. 1 skins are packed in a cask, or 4000 No. 2 grade skins. The packed casks are stored in a room maintained at a temperature between 35 and 45 deg. F. and kept moist. A warm room, dry atmosphere and changes of temperature are all bad for proper storage of skins.

Total Supply of Skins

An effort was made to determine with some degree of certainty the number of skins that could be obtained during any period of time. It is evident that the demand for beef governs this amount and cannot be absolutely forecast.

The four big firms, viz; Armour, Swift, Morris and Wilson handle approximately one-half of the total cattle killed in the United States. During the year 1921, Armour and Swift each killed approximately 10,000,000 animals, of which about 2,000,000, were cattle. Morris and Wilson's output is only about half of the other two firms. This gives us a total of 6,000,000 cattle per year.

The number of goldbeaters' skins available from these (75 to 80 per cent) is therefore between 4½ and 5 millions and will be in the ratio of about 2¾ to 3 million No. 1 grade and 1¾ to 2 million No. 2 grade. Of course, to obtain this whole amount, due notice of at least three months would have to be given the packers, and contracts entered into accordingly.

As stated above, these amounts represent approximately one half the total kill of the United States. If the skins available from all the smaller packers were obtained, the amounts would be doubled, giving a possible total of about 9 million skins. A fairly large number of these are in demand for bottle capping and other purposes, but the most conservative estimate would place the number still available for gas cell work at 5½ to 6 million.

Skins from South America

From information obtained at Swift & Co. their monthly kill of cattle in all of their South American plants is at present from 20,000 to 25,000, giving a total for the year of 240,000 to 300,000. Assuming that the other firms are in proportion, the probable total from the four big firms would, therefore, be about 750,000 to 900,000 animals, with a probable similar amount from all the smaller firms.

This gives the number of skins obtainable (75 to 80 per cent of kill) as 560,000 to 675,000, from the four big firms, with a possible similar amount from the smaller firms.

The ratio of 60 per cent No. 1 to 40 per cent No. 2 grade would hold good for these skins also.

The Improved Army-Liberty Engine

Some time ago there appeared in these columns a note describing the various improvements which the Naval Air Service introduced in the low-compression Navy-type Liberty engines with a view to increasing their serviceability. The wonderful performance of the high-compression Army-Liberty engine in the unofficial world's duration record of 35 hr. 18½ min. made by Lieuts. John A. Macready and Oakley G. Kelly, A.S., and in other numerous long distance flights made by Air Service officers, makes it timely to mention the many refinements which the Army Air Service introduced in the Liberty engine. In a recent issue of *Air Service News Letter* Lester D. Seymour gives the following description of these improvements.

As originally designed, with a total weight of 800 lb. and a horsepower of 400 at a propeller speed of 1700 r.p.m., the high-compression Liberty engine was equipped with two complete ignition systems to guard against the possibility of trouble in the air from that source, and also with two duplex carburetors, each divided into two units and each unit serving three of the twelve cylinders. Practically four separate carburetors were thus employed, but so set, adjusted and controlled that each cylinder would receive the same quality and quantity of fuel.

A most interesting point in connection with the water system is the circulating pump. This pump, though of the small centrifugal type, is capable of delivering 100 gal. of water per minute with a free outlet.

In an aircraft engine all working parts are usually lubricated by a direct oil lead carrying oil under pressure. Even though all means possible are employed to hold this pressure at the right value, sometimes too much oil reaches the piston wall. In the ordinary engine this results in oil passing the piston, fouling the spark plugs, forming carbon in the combustion chamber, hindering the proper operation of the valves, causing overheating, pre-ignition, etc. In order that these contingencies may be reduced to a minimum, four small holes were drilled in the oil pressure relief valve, giving an almost perfect balance to the oiling system at all speeds. As an extra precaution, the pistons have been grooved and drilled so that excess oil is collected and drained back into the crank case or "sump" before it has had a chance of getting to the combustion chamber.

One of the greatest triumphs of McCook Field has been the development of a centrifugal oil cleaner. This cleaner is made an integral part of the engine, removing impurities of all kinds from the oil as fast as they are collected. This not only makes it simply necessary to add the oil that is actually consumed but makes draining and washing of the oil system a thing of the past.

No effort has been spared to reduce the chances of a fire starting from the power plant. To this end flexible fuel line connections, impervious to vibration, have been developed. Carburetor air intake pipes have been led outside and above the engine housing where once gasoline vapor condensed and dripped back onto the engine, this resulting in the elimination of the possibility of the collection of gasoline where it could be ignited and cause damage.

By ingenious means and devices the engine's carburetors have been so changed that the gasoline consumption has been reduced approaching one-half the former amount. At the same time, much better proportions of gas and air have been secured, thus giving increased smoothness of operation, flexibility, and complete combustion. One of the greatest advantages secured by these changes is the greater range of altitudes at which uniform operation is possible.

Probably the greatest cause of fires in the past has been the fact that gasoline was led to the carburetors under air pressure and, when a leak in the system occurred, it caused the entire power plant, etc., to be subjected to a fine spray of fuel. Mixed with air, this, of course, forms one of the most inflammable mixtures known. All this has been changed now with the successful development of a mechanically operated fuel pump supplying gasoline to the carburetor without the use of pressure in the tanks.

Among other important items in re-design and re-construction are the following: A 12-volt system has been substituted for the 8-volt, in addition allowing the employment of a self-starter; storage battery improvements; addition of buzzer distributor starters, safety relays, etc.; more completely armored cables and positive connections. Other small items include redesigned flexible shafts, larger bearings, stronger gears and water system improvements.

"Who's Who in American Aeronautics"

(Copyright, 1921, by The Gardner, Moffat Co., Inc.)

The biographical sketches of men who are prominent in American Aeronautics are printed periodically in AVIATION. The first series have been published in a more durable form, and revised issues will be published from time to time to take care of the frequent changes in station of Army and Navy officers, and such other changes as may occur. As errors and omissions are liable to occur in a compilation of this character, interested parties are requested to notify "Who's Who" Editor of the necessary corrections so the record may be kept up to date.

Maxwell Kirby

KIRBY, MAXWELL, Major, Air Service; born, Nebraska, Feb. 1, 1887; son of Thomas Kirby, Jr., and Anna (McInerney) Kirby; married, Mary Pauline Kindleberger, Sept. 21, 1920.

Educated: Public Schools and High Schools of Nebraska; St. John's College.

Professional: U. S. Coast Artillery, three years; U. S. Cavalry, three years; U. S. Air Service, six years.

Aeronautical Activities: Pilot and Observer, First Aero Squadron, Mexico, 1916; in charge of cross country and night flying, Kelly Field, 1917; organized 13th Aero Squadron; in charge of training, Wilbur Wright Field, 1917; in command of Chanute Field, 1917; Air Service Inspector, Washington, D. C., 1917; in command of Gerstner Field, 1918; had the first aerial ambulance built; organized and was first president of U. S. Air Service Association; to A.E.F., July 1918; pursuit and gunnery schools, France, 1918; pursuit pilot 94th Squadron, Meuse Argonne offensive, First Army; organized and in command of Fifth Pursuit Group, France, Second Army; commanded Fifth Pursuit Group, Third Army in Germany, 1919; returned to U. S. Aug. 1919; Chief of Operations Division and Training Division, Office, Chief of Air Service, 1920 to 1921; Air Officer, Fifth Corps Area, 1921 to date.

Flying Rating: Junior Military Aviator, 1916; Military Aviator, 1919; Airplane Pilot, 1920.

Present Occupation: Chief of Operations and Training Division, Office, Chief of Air Service.

Address: Washington, D. C.

Charles Joseph McCarthy

McCARTHY, CHARLES JOSEPH, Lieut. (C. C.) U. S. Navy; born, Lawrence, Mass., Oct. 1, 1895; son of C. A. McCarthy and G. V. McCarthy.

Educated: Lawrence High School, 1912; Mass. Inst. of Tech., B.Sc. 1916.

Professional: Asst. Instructor, Civil Engr. Dept., Mass. Inst. of Tech., June 1916 to June 1917.

Aeronautical Activities: Aeronautical Draftsman, Bureau of Construction and Repair, Navy Dept. in Washington, Buffalo and Garden City on design of NC1 flying boat being responsible for the structural strength thereof, Aug. 1917 to April 1918; entered U. S. Naval Reserve Force with rank of Ensign, May 1918; continued engineering duties on NC boats; at start of Trans-Atlantic flight flew to Trepassey Bay, N. F., on board the NC1 as the representative of the Bureau of Construction and Repair; attached to Aviation Section, Bureau of Construction and Repair (later Bureau of Aeronautics) in charge of Structures Sub-section of Design Div., from May 1918 to date.

War Service: Ensign, U.S.N.R.F. Apr. 29, 1918; Lieut. (C.C.) U.S.N., Nov. 28, 1921.

Present Occupation: Lieut., (C.C.) U.S.N.

Address: Bureau of Aeronautics, Navy Dept., Washington, D. C.

John Mitchell

MITCHELL, JOHN, Sugar Merchant; born, Cincinnati, Ohio, Oct. 15, 1895; son of Walter J. Mitchell and Eva (Sherlock) Mitchell.

Educated: Private Schools; Harvard College, 1918.

Aeronautical Activities: Enlisted Key West, Fla., Mar., 1917 as Sergeant, Signal Corps; preliminary flying training Miami, Fla. Mar. 1917-June 1917; student Mass. Inst. of Tech. Ground School, June-Aug. 1917; Essington, Pa. Aug. 1917; ordered A.E.F. France, Sept. 11, 1917 in charge casual detachment aviation cadets; stationed Issoudun, Oct. 1917-Mar. 1918; Gunnery Course Cazaux, France, Apr. 1918; attached as pilot 95th Aero Squadron, Apr. 17, 1918, with station on Toul front; assumed command 95th Squadron Oct. 14, 1918 as Captain; ordered to U. S. A. Jan. 1919 and demobilized Feb. 16, 1919 at Mineola.

War Service: Pilot 95th Aero Squadron, Apr. to Dec. 1918, Toul, Chateau Thierry, Argonne and St. Mihiel fronts.

Honors: Croix de Guerre with palm from French VI Army, May 27, 1918; Distinguished Service Cross, Dec. 13, 1918.

Present Occupation: Sugar Merchant.

Address: Manchester, Mass.

Henry Varnum Butler

BUTLER, HENRY VARNUM, Captain, U. S. Navy; born, Paterson, N. J., Mar. 9, 1874; son of Henry V. Butler and Mary B. Butler; married, Anna Kilshaw, Oct. 18, 1917.

Educated: Grammar and High Schools of Paterson, N. J.; U. S. Naval Academy, June 1895; U. S. Naval War College, 1921.

Aeronautical Activities: Ordered in "Command Aircraft Squadrons, Battle Fleet" Oct. 22, 1921.

War Service: U.S.S. Olympia in Spanish-American War (Manila Bay), May 1, 1898; U.S.S. Buffalo in Boxer War; Commanding U.S.S. San Francisco during entire period of World War (Northern Mine Barrage); Commanding U.S.S. Mindoro in Philippine Insurrection for six months.

Honors: U. S. Navy Distinguished Service Medal; Citation: "For exceptionally meritorious service in a duty of great responsibility in command of the U.S.S. San Francisco, engaged in laying mines in the North Sea."

Member: Army and Navy Club, (Wash., D. C.); New York Yacht Club; Army and Navy Club (Manila).

Present Occupation: Commander Aircraft Squadrons, Battle Fleet.

Address: U.S.S. Aroostook, Pacific Station, c/o Postmaster, San Francisco, Calif.

Carl H. Wolfley

WOLFLEY, CARL H., Automobile Business; born, Hiawatha, Kans., July 3, 1883; son of Joseph Wolfley and Katherine Wolfley; married, Maude Elliott, June 17, 1906.

Educated: District Schools; Kansas City Business College, (Commercial Course).

Professional: Farming for two years; U. S. Government Service, Indian Territory, three years; grain business in Walthill and Merna, Nebr. 11 years; automobile business, St. Joseph, Mo., five years.

Aeronautical Activities: Appointed, Chairman Aviation Committee, Hiawatha Chamber of Commerce, 1920; Treasurer of the Commercial Aeronautical Association of the Seventh Corps Area.

Present Occupation: Automobile Business.

Address: 301 South Eight St., St. Joseph, Mo.; home, 2909 Lafayette St., St. Joseph, Mo.

Loring Pickering

PICKERING, LORING, Publisher; born, San Francisco, Calif., Aug. 31, 1888; son of Loring Pickering and Rose (Crothers) Pickering; married, Harriett C. Alexander, June 17, 1916.

Educated: Trinity School, San Francisco, Calif.; Stanford University; Chicago Law School; Oxford University and Sorbonne.

Professional: Associate Editor of "The Bulletin", San Francisco, Calif.; General Manager, "North American Newspaper Alliance", New York.

Aeronautical Activities: Captain and Major, Air Service.

Flying Rating: Reserve Military Aviator.

Present Occupation: General Manager, North American Newspaper Alliance.

Address: 63 Park Row, World Bldg., New York.

Norbert Carolin

CAROLIN, NORBERT; Captain, Air Service; born, Montclair, N. J., Nov. 25, 1888, son of William V. Carolin and Marie (Mott) Carolin.

Educated: Clinton High School.

Professional: Electrical Engineer.

Aeronautical Activities: Started flying Nov 1, 1915; 1st. Lieut., 1st Aero Co., Mexican Border, 1917; World War, June 1, 1917, to Nov. 11, 1918.

Flying Rating: Reserve Military Aviator, Dec. 8, 1916.

War Service: C. O. 119th, 271 st, 258th, 24th and 25th. Squadrons.

Member: Society Automotive Engineers.

Present Occupation: Commanding Officer, France Field, C. Z.

Address: France Field, Canal Zone; home, Pennsylvania Ave., Long Beach, N. Y.

Henry Closson Kenly

KENLY, HENRY CLOSSON; born, Ft. Monroe, Va., July 31, 1895; son of William L. Kenly and Julie T. (Closson) Kenly.

Educated: Friends School, Washington, D. C.; George Washington University, 1916; Sheffield Scientific School of Yale University, 1916 to 1917.

Professional History: Secretary-Treasurer and Director of Kenney-Cleary Oil Co., Ponca City, Okla., June 1919 to June 1922.

Aeronautical Activities: Ground School, Princeton, N. J., June 1, 1918 to Aug. 24, 1918; Mather Field, Sept. 1, 1918 to Nov. 11, 1918; Rockwell Field, Nov. 12, 1918 to Mar. 18, 1919 (aerial gunnery and pursuit instruction).

Flying Rating: Reserve Military Aviator, Nov. 8, 1918; Qualified Pursuit Pilot, Feb. 7, 1919; joint Army and Navy Board on Aero. Cognizance, License No. 472, May 10, 1919.

War Service: R.O.T.C., Ft. Meyer, Va., May 10 to Aug. 9, 1917; 2nd Lieut. I.R.C., 317th Infantry, Camp Lee, Va., Aug. 11, to Dec. 1, 1917; 2nd Lieut. N.G., A.D.C. to General Whitney, 63rd F.A. Brigade, Camp Shelby, Miss., Dec. 2, 1917 to March 23, 1918; 1st Lieut., N.G. Field Artillery, 63rd F.A. Brigade, March 23, 1918 to May 15, 1918; 1st Lieut. S. C. Princeton Ground School, June 1, 1918 to Aug. 24, 1918; 1st Lieut. A.S.M.A. Mather Field, Sept. 1, 1918 to Nov. 11, 1918; 1st Lieut., R.M.A., A.S.M.A. Rockwell Field, Nov. 12, 1918 to March 18, 1919.

Address: 540 Park Ave., East Orange, N. J.

Howard D. Ingalls

INGALLS, HOWARD D., Air Mail Service; born, Wheatland, N. Y., Sept. 8, 1892; son of Richard Ingalls and Caroline (Johnson) Ingalls.

Educated: Scottsville High School, (N. Y.); Rochester Mechanics Institute.

Professional: Cunningham Automobile Co., Rochester, N. Y., 1911-1914; Curtiss Aeroplane & Motor Corp., N. Y., 1914-1916; British Government, A.I.D., Hammondsport, N. Y., 1916-1917; U. S. Government, Bureau Aircraft Production, 1917-1919; Curtiss Northwest Airplane Co., Minneapolis, Minn. 1919-1921; U. S. Air Mail Service, 1921 to date.

Aeronautical Activities: Mechanical Engineer, Curtiss Aeroplane & Motor Corp., 1914-1916; Senior Inspector, Engine Tests, British Gov't., A.I.D., 1916-1917; Aeronautical Mechanical Engineer, U. S. Gov't., Bureau Aircraft Production, 1917-1919; Flying Mechanic, Curtiss Northwest Airplane Co., 1919-1921; Mechanic, U. S. Air Mail Service, 1921-May 1921; Manager, Air Mail Field, Rock Springs, Wyo., July 1921; Ass't. Superintendent, Central Div., Air Mail Service, Cheyenne, Wyo., Jan. 1, 1922 to date.

Member: American Automobile Association; Registered Racing Driver, A.A.A.

Present Occupation: Ass't. Supt., Central Div., Air Mail Service.

Address: U. S. Mail Field, Cheyenne, Wyo.; home, 12 Van Buren St., Newark, N. Y.

Alfred Wilkinson Johnson

JOHNSON, ALFRED WILKINSON, Captain, U. S. Navy; born, Philadelphia, Pa., Nov. 18, 1876; son of Philip C. Johnson and Elvira (Lindsay) Johnson; married, Hannah Harris, 1903.

Educated: Public Schools of Washington, D. C.; Naval Academy.

Aeronautical Activities: Commander Air Squadrons, U. S. Atlantic Fleet, Oct. 1920-July 1922; operating with fleet in West Indies and Central America and during bombing exercises with ex-German war ships off Virginia Capes.

War Service: Spanish-American War, U.S.S. Massachusetts; West Indian Campaign. Philippine Insurrection, U.S.S. New York; World War, West Coast of Ireland, destroyer patrol.

Honors: Distinguished Service Medal, order of St. Michael and St. George (British).

Member: Metropolitan Club; Army and Navy Club; New York Yacht Club.

Present Occupation: Bureau of Navigation, Navy Dept.

Address: Washington, D. C.; home, 1709 M St., N. W., Washington, D. C.

2000-Mile Non-Stop Flight

Lieuts. Macready and Kelly Fly from Rockwell Field to Schoen Field

Lieuts. John A. Macready and Oakley G. Kelly, Air Service, beat all previous performances in non-stop flight on Oct. 3-4, when they piloted the Army-Fokker monoplane T2 from Rockwell Field, San Diego, Calif., to Schoen Field, Fort Benjamin Harrison, Ind., an airline distance of 2060 miles which they covered in 27 hr. 56 min.

The flight was undertaken with a view to making a non-stop flight from the Pacific to the Atlantic—the terminus chosen being Mitchel Field, L. I. A leaking radiator unfortunately prevented the two pilots from carrying out their project, adding greatly to their difficulties, caused by violent storms which were encountered over the Rockies. To prolong their flight as much as possible, the pilots poured into the radiator all the coffee, soup and condensed milk they carried along, but the engine soon began to heat abnormally and forced them to land at Schoen Field.

The longest previous non-stop flight between two points was the crossing of the Atlantic made by John Alcock and Arthur W. Brown on a Vickers "Vimy" bomber, on June 14, 1919, the distance being 1930 miles.

N.A.C.A. for National Air Policy

The temporary draft of a national air policy was drawn up by the National Advisory Committee for Aeronautics at its eighth annual meeting, held at Langley Field, Oct. 19. Each member has a copy of the tentative outline of an aeronautical policy for the United States and at a future meeting of the Executive Committee the details and recommendations will be worked out for final form. The complete report will be submitted to President Harding with the annual report of the Committee in December.

Among the reports considered at the meeting was that of the Special Committee on the structure of the Navy's rigid airship ZR1 now in course of construction at Lakehurst, N. J. The final report will be submitted to the Executive Committee following the next meeting of the special committee in Washington.

The increase of annual appropriations amounting to about 30 per cent of the first budget was announced at the sessions at Langley Field. Total available funds for the fiscal year 1924 approved by the Budget Bureau now amount to $260,000. This will be used in experiments and research work, the Committee announced.

The eighth annual meeting of the N.A.C.A. was the first that the entire committee, comprising representatives of the Army and Navy Air Services and civilian experts has held at Langley Field. By courtesy of the President, the committee proceeded from Washington in a body on the President's yacht, the U.S.S. Mayflower.

Dr. Ames conducted a tour of inspection of the facilities available at the committee's laboratory for scientific research in aeronautics. The members were particularly interested in the new compressed air wind tunnel, which has just been completed and placed in operation. The committee will prepare a complete descriptive announcement of this unique apparatus in the near future. Dr. Ames stated that in the theoretical study of aerodynamics during the past year, the committee has taken a position in the forefront of the world. He reviewed generally the work accomplished, and particularly the methods devised for the study of the characteristics of an airplane in free flight and the strains and stresses to which its structure is subjected during maneuvers. He dwelt at length on the need for enlarging the facilities for the conduct of many scientific investigations now engaging the attention of the committee. Dr. Ames recounted his observations and experiences abroad during the summer of 1922, with particular regard to the organization and progress of research in aeronautics in the more progressive European countries.

General Patrick at the meeting requested the committee carefully to check the plans and calculations of the new Army semirigid airship in a manner similar to the study the Committee is now making of the Navy Fleet Airship ZR1.

The officers of the committee were reelected for another year as follows: Dr. Walcott, Chairman, Dr. Stratton, Secretary, and Dr. Ames, Chairman of the Executive Committee. Orville Wright was elected a member of the Executive Committee for the ensuing year. The Chairman announced the appointment by the President of Comdr. J. C. Hunsaker, U.S.N., as a member of the committee to succeed Rear Admiral D. W. Taylor recently retired from active duty in the Navy. Commander Hunsaker is in charge of the Design Section of the Naval Bureau of Aeronautics. The Chairman also announced that on the day following Admiral Taylor's separation from the committee as a Navy member, he was reappointed by the President in a civilian capacity to fill the vacancy caused by the resignation of Dr. Michael I. Pupin. Dr. Pupin, in tendering his resignation, stated that he was very reluctant to sever his connection with the committee, but found himself unable to devote as much time to the work of the committee as he should like to.

The members of the Mayflower party follow: Chairman, Dr. Charles D. Walcott, Secretary, Smithsonian Institution; Secretary, Dr. Samuel W. Stratton, Director of Bureau of Standards; Dr. Joseph S. Ames, Chairman, Executive Committee, of Baltimore; Maj. Gen. M. M. Patrick, Chief, U. S. Army Air Service; Rear Admiral W. A. Moffett, Chief, Naval Bureau of Aeronautics; Rear Admiral D. W. Taylor, U.S.N., retired; Prof. Charles F. Marvin, U. S. Weather Bureau; Dr. John F. Hayford, Northwestern University; Dr. Michael I. Pupin, Columbia University; Orville Wright, Dayton, Ohio; Comdr. J. C. Hunsaker, U.S.N., Bureau of Aeronautics; George W. Lewis, Executive Officer; J. F. Victory, Assistant Secretary.

Boston Air Board Created

At the request of the National Aeronautic Association, and upon the recommendation of Maj. Gen. Clarence R. Edwards, commanding the First Corps Area, Mayor Curley of Boston has appointed a Municipal Air Board for that city to encourage the development and support of the profession of aeronautics.

Following are the members of the Boston Air Board as given by the Boston *Transcript*: Prof. Edward P. Warner of the Massachusetts Institute of Technology; Everett Morss of the Boston Chamber of Commerce; James T. Williams, Jr., of the Boston *Transcript;* Gardiner H. Fiske of the 101st Aero Squadron, Massachusetts National Guard; Arthur L. Richmond of the Aero Club of Massachusetts; Maj. E. B. Lyon, air officer, First Corps Area; Thomas E. P. Rice of the Archie Club; Charles E. Jeffrey, Jr.; Postmaster Roland M. Baker; Gen. John H. Dunn; Gen. Charles H. Cole; State Commander William H. Doyle of the American Legion, Porter Adams and Colonel E. S. Gorrell. The chairman of the Board will probably be Colonel Gorrell who has recently arrived in Boston to become the president of the Marmon Automobile Co. of Boston. He is a graduate of West Point, and performed valuable service in the war as a colonel in the Army Air Service.

ARMY AND NAVY AIR NEWS

Air Service

Long Cross-Country Flight—A 1700-mile cross-country flight in a DH4B airplane from Boston to Detroit, Dayton and Washington and return was completed Oct. 26, when Lieut. R. Curtis Moffat, assistant air officer of the First Corps Area, and James T. Williams, Jr., traveling as a civilian passenger, landed back again at the Army flying field at Framingham, having made the last lap of the journey from Mitchel Field, L. I., in 1 hr. 30 min.

The total flying time for the trip was 19½ hr.; the total distance traveled 1715 miles; and the number of hops eleven.

According to the official report made by Lieutenant Moffat to the Chief of Air Service no trouble of any kind was experienced during the journey. The Liberty motor functioned perfectly all the time. The average air speed was 90 m.p.h.

Going to Detroit stops were made for gas and oil at Mitchel Field; the Air Mail Feld at Bellefonte, Pa.; and Air Mail Field at Cleveland, Ohio. Coming back the ship was gassed and oiled at McCook Field, Dayton; at Langin Field, Moundsville, W. Va., at Bolling Field, Washington, and again at Mitchel Field. Landings were also made at Logan Field, Baltimore, to see the excellent field used by the National Guard Squadron in that State, and in Media, Pa., near Philadelphia, to attend the dedication of that field, which is to be used by Reserve officers in that locality.

* * *

Marking the Model Airway—Airmen flying between Moundsville, West Va., and Dayton, Ohio, will now have no difficulty in ascertaining the name of any particular town they may be flying over. Recently a marking party in charge of H. O. Sine, of the Engineering Division at McCook Field, Ohio, completed the work of painting markers on designated towns along the route of the Model Airway between the points designated. This work was started on May 9 last.

There are 36 towns on the route and 48 markers. On the total elapsed time of 95 days this makes an average of about two days per marker, and 1¼ days per marker on the actual working time. About 216 gal. of white paint were used, or an average of 4½ gal. per marker. also a total of 68 gal. of black paint were used, an average of 1½ gal. per marker. The average number of letters per marker was 8, and the average size of the letters was 15 ft. high by 12 ft. wide and 2½ ft. stroke.

The towns visited and the particular building marked in such towns are given below, as follows:

Troy, Ohio	Gummed Products Co.
Xenia, Ohio	Xenia Shoe Mfg. Co.
Yellow Springs, Ohio	E. C. Littleton & Sons
S. Charleston, Ohio	Tanner-Robinson Lumber Co.
Sedalia, Ohio	Grain Elevator, Mr. Bettchard, Prop.
London, Ohio	Storage Building, H. P. Ford, Prop.
Mechaniesburg, Ohio	Tanner-Robinson Lumber Co.
Urbana, Ohio	Oil Refining & Development Co.
Cedarville, Ohio	Tarbox Lumber Co.
Westerville, Ohio	Cellar Lumber Co.
Baltimore, Ohio	Fairfield Paper Co.
Newark, Ohio	P. S. Smith & Sons Lumber Co.
Dresden, Ohio	The John Herman Miller Co., Ohio Knitting Mills.
Zanesville, Ohio	Pennsylvania R. R. Freight Depot.
Cambridge, Ohio	Cambridge Foundry & Machine Co.
Barnesville, Ohio	McClelland-Kennard Co., Wholesale Grocers.
Batesville, Ohio	General Store & Post Office, A. F. Dowden, Prop.
St. Clairsville, Ohio	Clarendon Hotel.
Moundsville, W. Va.	Hangar roof at Langin Field.
Wheeling, W. Va.	Pennsylvania R. R. Freight Depot
Woodsfield, Ohio	John Burgbacher Lumber Co.
Caldwell, Ohio	Chas. Nichols & Sons, Garage.
Malta, Ohio	Brown-Manly Plow Co.
New Lexington, Ohio	The Smith-Flautt Lumber Co.
Shawnee, Ohio	Garage, M. Francis, Prop.
Logan, Ohio	Owen Mfg. Co.
Springfield, Ohio	Pennsylvania R. R. Freight Depot.
Miamiburg, Ohio	Ohio Paper Co.
Middletown, Ohio	Middletown Machine & Tool Co.
Lebanon, Ohio	Wm. Evans Lumber Co.
Wilmington, Ohio	Champion Bridge Co.
Washington, C. H., Ohio	Sunlight Creamery Co.
Circleville, Ohio	Circleville Lumber Co.
Lancaster, Ohio	Shaw Turner Elevator Co.
Columbus, Ohio	Kinnear Mfg. Co.
	Federal Glass Co.
	H. H. Giesey & Bros. Lumber Co.
	General Reserve Depot.
Mt. Sterling, Ohio	The Sterling Grain Co.

* * *

Awards of D.S.C.—The Distinguished Service Cross was awarded on Sept. 13, 1922, by the War Department to the following named Air Service officers:

Robert Glendinning, lieutenant colonel, Air Service, United States Army. For exceptionally meritorious and distinguished services. As classification officer for the Air Service in the casual officers' depot, Blois, France, through his untiring energy and sound judgment he developed an efficient system of classification, which was of great assistance to the American Air Forces. Later, as a representative of the Air Service, American Expeditionary Forces in Italy, he was charged with many and intricate negotiations with the Italian Government, which he conducted with rare intelligence, sound judgment, and successful results. Residence at appointment: 400 Chestnut Street, Philadelphia, Pa.

Harry A. Toulmin, jr., lieutenant colonel, Air Service, United States Army. For exceptionally meritorious and distinguished services. As head of the coordination section of the staff of the Chief of Air Service, American Expeditionary Forces, he was charged with the responsibility for outlining and developing an organization to handle the many and grave problems of administration, mobilization, supply, and armament. In the performance of this duty he displayed rare intelligence, great initiative, broad vision, and an ability to obtain results, thus contributing materially to the success of the American Expeditionary Forces. Residence at appointment: 315 Oakwood Avenue, Oakwood Village, Dayton, Ohio.

* * *

A New Airplane for the Chief of Air Service—Gen. Mason M. Patrick, Chief of Air Service, now has a brand new airplane of special construction for use when making inspection trips to various Air Service stations. This plane was constructed at his request at the Fairfield Air Intermediate Depot, Fairfield, Ohio, and is especially adapted for long-distance cross-country flights. It is a DH4B3, having a gasoline capacity of 138 gal. and an oil capacity of 18 gal. Under normal operating conditions it is capable of remaining in the air for 6½ hr.

The fuselage is a mahogany finish, while the wings and tail surfaces are a natural finish. The engine cowling, radiator shell and under panel are of buffed aluminum with a lacquer finish, making in all a very desirable combination.

Field Officers' School—The Field Officers' School at Langley Field, Va., is rapidly being filled, both by officers arriving from distant fields and by those who are being relieved from their present duties at Langley Field to be assigned to the school for this course of training.

Among those present at the opening session on Oct. 20 were: Majs. Henry B. Clagett and Robert Coker; Capts. Lynwood B. Jacobs, Ralph H. Wooten, Howard J. Houghland, Rosenham Beam, Francis M. Brady, Edmund W. Hill, Hubert V. Hopkins, George S. Warren, Chilion F. Wheeler and George P. Johnson. Other officers are expected to arrive daily in time to attend the opening of the course.

* * *

From Los Angeles to San Francisco in Record Time—All speed records for travel between San Francisco and Los Angeles, Calif., were broken by Lieut. Walter Miller, A.S., on Oct. 2, when he covered the 475 miles distance between these two cities in 2 hr. 58 min., thereby cutting the previous record by 7 min.

Naval Aviation

The U.S.S. Langley—The U.S.S. Langley from which the flying-off and alighting experiments were made as reported in our last week's issue is the most modern aircraft carrier of the U. S. Navy.

While the Langley is principally a floating airdrome and aircraft mothership for airplanes and seaplanes, the vessel also serves as a sea-going radio laboratory for the study and development of radio communication between aircraft and ships.

Her great flying deck, which stretches for 520 ft. from stem to stern and is 65 ft. wide, prevents the erection of permanent masts for radio or other purposes—her "top sides" must be clear for the launching and landing of her aircraft. Special telescopic masts have been installed amidships, approximately 250 ft. apart, fore and aft, which can be elevated when desired, and housed below decks when planes are being projected into the air by the catapults or alighting from the air on the spacious upper deck. The masts, 50 ft. in height and used primarily for the radio aerials, are controlled by hand-operated gears which raise and lower them somewhat as periscopes are operated. When lowered, the aerials are unhooked and stored below or laid alongside the palisades which guard the edges of the flying deck. The masts are elevated simultaneously after the antenna wires are hooked on. This aerial is the principal one used for long distance communication. Auxiliary antenna are carried aft along both port and starboard sides. These antenna are hung outboard on davits which can be swung in like ordinary boat davits, and housed close to the vessel's side when not in use. Primarily these antenna are used to work nearby land stations and aircraft when aloft, as they do not interfere with the operation of the landing deck. At sea with no aircraft aloft, the vessel uses its mast antenna, but when planes are taking off and landing, the auxiliary side antenna are used, although the masts could be raised for transmitting a message and then lowered.

Another feature of this unique vessel is the plane elevators which raise and lower planes from the storage hold below and the top of the elevators forming part of the ship's deck when they are "down" like the radio house roof. Forward and aft are the catapults for launching the planes, as well as the arresting gear for stopping them when they land. Most of the usual "top side" equipment of an ordinary ship is below the flying deck, such for example as the pilot house, which is well forward, port and starboard jib cranes for lifting sea planes from the water, the four 5-in. rifles, and deck houses. Her two funnels project from her sides toward the stern, where they may be turned upward, aft or downward to keep the smoke from the upper deck.

Great results are expected from the Langley, the first aircraft carrier of the Navy, and many advanced experiments in radio communication with aircraft are planned. The lessons learned in practical aeronautical operation at sea will be incorporated in the new aircraft carriers which the Navy will build out of two battle cruisers scrapped by the Armament Conference.

Admiral Moffett's Aide Goes to Delaware—Comdr. William J. Giles, U.S.N., who has been Aide to Admiral Moffett, Chief of the Naval Bureau of Aeronautics since the creation of the separate bureau, has been assigned to sea duty and will serve on the battleship Delaware as Executive Officer. The transfer is to be made effective on Nov. 6, 1922.

National Guard Aviation

Tennessee National Guard Air Service—The following report was received from the Instructor of the Air Service, Tennessee National Guard, covering the recent summer encampment at the Montgomery, Ala., Air Intermediate Depot:

"Our first summer in the field has come and gone, and, thanks to the hearty cooperation of Major Clagett, Major Brown, and the officers and enlisted men of the 22nd Squadron, it was a most successful camp.

"We flew three planes to Montgomery, and the remainder of the squadron, 12 officers and 90 enlisted men, went down via rail, arriving Monday night. The next day our work began in earnest at 5.00 a. m., and a stiff schedule was carried on for two weeks. It was the first day of our work that Lieut. Boyd T. Riley was seriously injured, but fortunately not fatally. He is now at the Walter Reed General Hospital and we hope he is on the way to a rapid recovery.

"The most successful part of the whole schedule was the work accomplished by the enlisted men. The classes in rigging, motor overhaul, carburetion, ignition, photography, radio and machine guns were very thorough, and the men are much better fitted for their work after two weeks of concentrated study and application. They left camp feeling they had learned something, and are now eager to put their knowledge to a practical test.

"The pilots of the squadron were unable to fly as much as they expected, mostly because their classes interfered. However, the fact that they brought back six ships to Nashville speaks for itself, for it is a 300-mile hop over some very rough country. Right here let us say a word of appreciation for the reception accorded us by the 135th Birmingham Squadron during our short visit with them on the return trip.

"Our observers were given a very thorough practical course, and, although not experienced, their work was very commendable. In two weeks they absorbed much and proved most efficient in the elementary part of their work. The course comprised radio, drop messages, reconnoissance, liaison, artillery reglage and infantry contact. Upon the arrival of radio and photographic equipment they are now ready to carry on.

"Shortly before the close of camp the officers of the 22nd Squadron were our guests at a dinner given on the roof of the Beauvoir Club. The party was a howling success, and favors given several of the regular army men and also some of us were the cause of much good natured joshing. This was particularly true for those who received a box of fish food, a rattle, a flapper, a pair of specs and the baby buggies. A unique leather bound volume was presented to Major Clagett by our Commanding Officer, Major Bennett. It was a tricky little affair entitled "Spring Poems"—The Tale of Four Swallows, by B. J. Corn, Volume No. 4."

Coming Aeronautical Events

AMERICAN

Nov. 19 — *Aviation Meet to assist the family of late Lieut. Belvin W. Maynard, Curtiss Field, L. I.*

FOREIGN

1923

Dec. 15-*Jan.* 2 — *8th International Aeronautic Exposition, Paris, France.*

June — *International Aero Congress, London.*

Aeronautical Map of Italy

Recognizing the need of an aeronautical map of the Kingdom, that will offer information and exact references to aerial navigators, the Secretary of State has decided to call a competition for the edition of an aeronautical map of Italy open to Italian citizens only.

The following prizes have been assigned:

1st prize—Lire 20,000
2nd " —Lire 10,000
3rd " —Lire 5,000

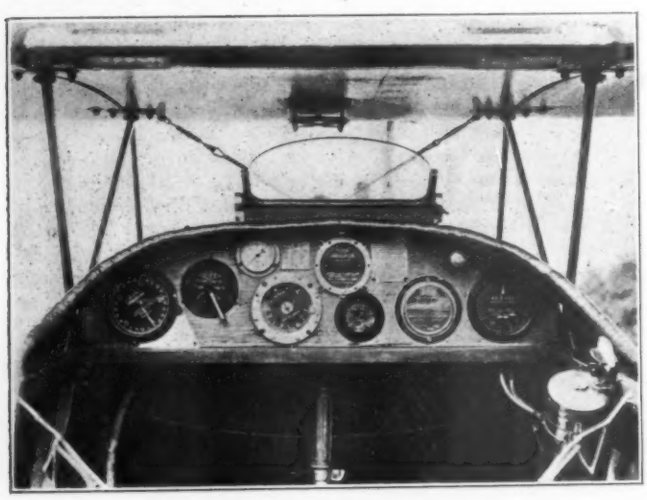
The contestants will have to present the original or the lithgraphic production of one sheet of the future aeronautical map of Italy and precisely the one comprised between 8° and 9° of longitude East Greenwich, 45° and 46° of northern latitude.

The jury will consist of: the Director of the Geographical Military Institute, a deelgate of the Hydrographic Institute of the Royal Navy, a representative of the Aeronautical Inspectorate of the Royal Navy and an authorized member of the National Sport Associations.

The works which will be awarded prizes will be used for the edition of the aeronautical map of Italy, with the necessary changes and additions as required.

Long Cross Country Flight

Probably the oldest aviator in the world, Col. C. C. Dickinson of Chicago, 62 years old and a pilot, left Washington on Nov. 2 en route for Chicago on the last leg of a remarkable flight. The Colonel, in his Laird "Swallow" aerial knockabout, flew from Chicago to the recent aviation meet at Detroit and, following the Pulitzer Trophy race, hopped off



Cockpit of the Army Messenger plane equipped with a complete set of Sperry flight instruments

for a trip to Florida, stopping over one day on the return to visit the national headquarters of the National Aeronautic Association in Washington, D. C.

Colonel Dickinson, then 50 years of age, was taught to fly in 1910 by the famous British pilot, Claude Grahame-White, who visited this country for the Gordon Bennett airplane race of that year. Since that time the Colonel has been an aeronautical enthusiast and a supporter of the progress of commercial aviation in this country. He took an important part in the deliberations of the Detroit Aero Congress, and was a much interested observer of the Pulitzer Race.

On reaching Chicago Colonel Dickinson will have completed an aerial tour of 3,510 miles which, for a man of his age, might seem remarkable, but the Colonel considers it nothing unusual in view of the present reliability of American aircraft, and the comfort of traveling by air.

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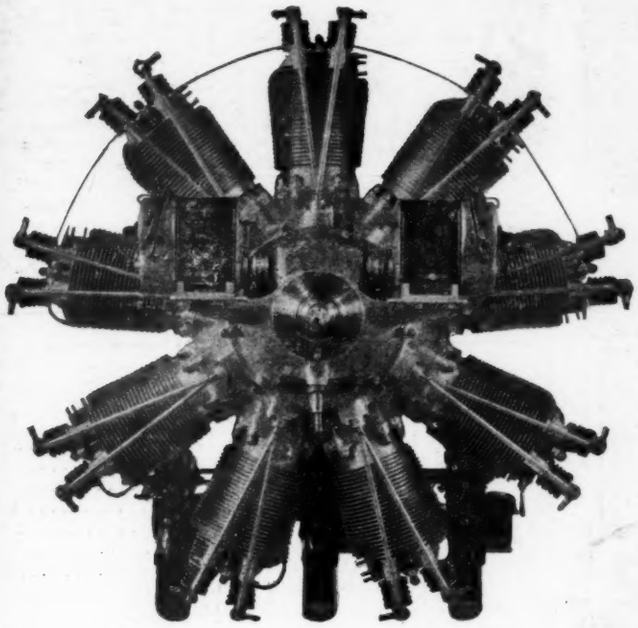

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INDEX TO ADVERTISERS

A

Aircraft Service Directory..... 674

C

Classified Adv..... 672
Curtiss Aeroplane & Motor Corp..... 676

D

Dayton Wright Co..... 669

F

Ferdinand, L. W., & Co..... 672
Fokker 671

H

Hartshorn, Stewart, Co..... 672
Huff Daland Aero Corp..... 673

J

Johnson Airplane & Supply Co..... 673

L

Lawrance Aero Engine Corp..... 671
Lincoln Standard Aircraft Co..... 672

M

Martin, The Glenn L., Co..... 654

N

Northrop, Marvin A..... 672

P

Packard Motor Car Co..... 651

S

Sperry, Lawrence, Aircraft Co., Inc..... 670

T

Thomas-Morse Aircraft Corp..... 653
Thurston, W. Harris, & Co., Inc..... 672

V

Vought, Chance, Corp..... 659

W

Wellington, Sears & Co..... 672
Where to Fly..... 668
Wright Aeronautical Corp..... 652

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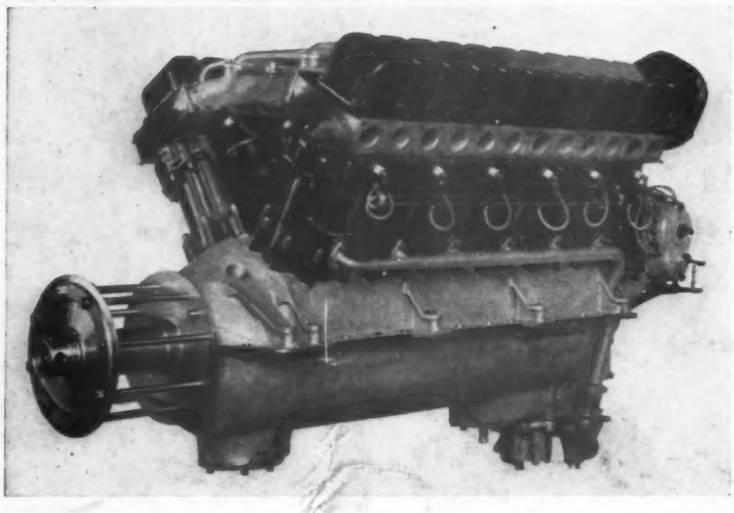

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